



Combined Sewer Overflow/Stormwater Outfall Investigation Program

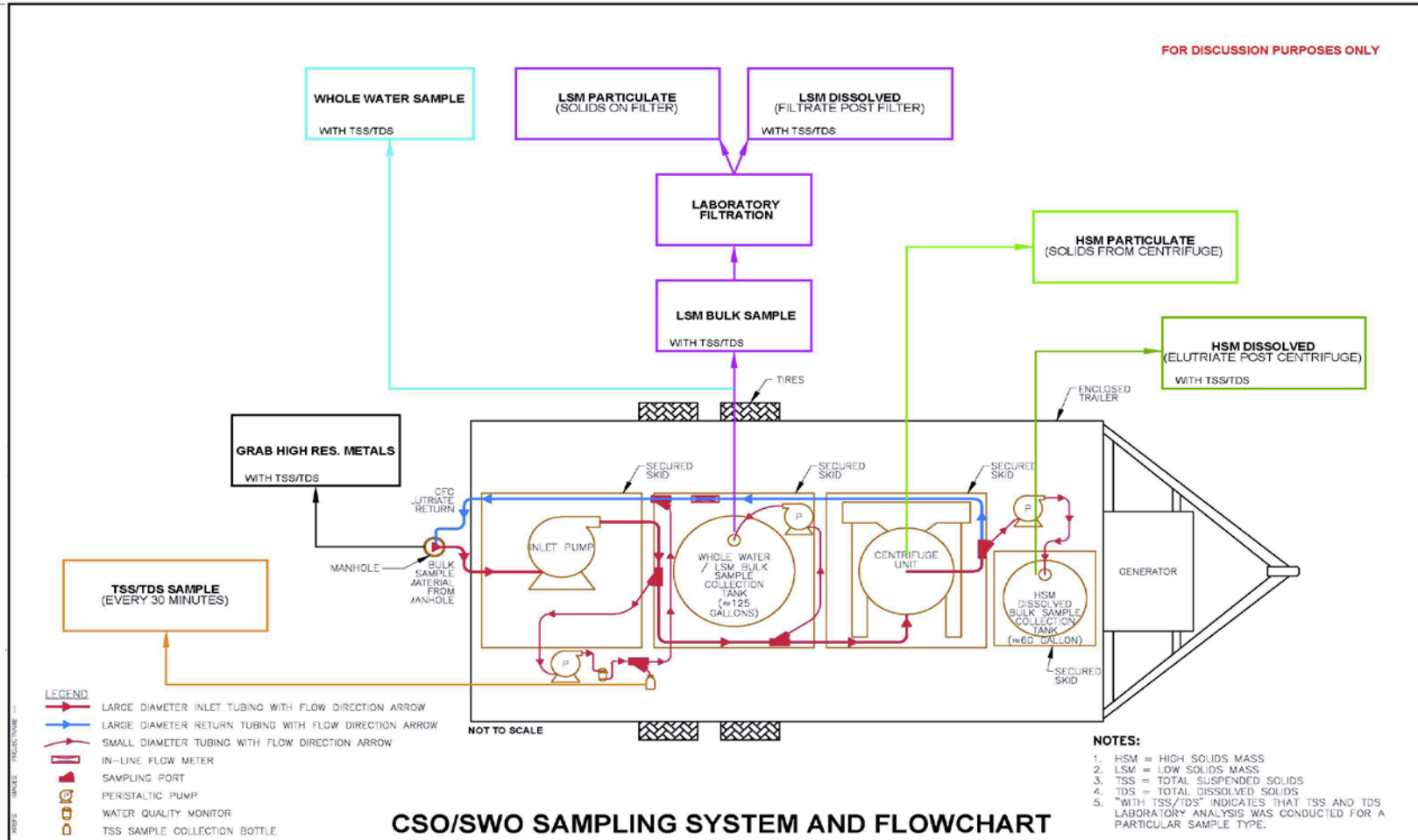
USEPA AND PVSC MEETING - PHASE I DATA EVALUATION AND
PHASE II APPROACH

NOVEMBER 17, 2015

Agenda

- Phase I Program Overview
- Phase I Data Evaluation Process and Findings
- Phase I Lesson Learned and Method Selection Supporting Information
- Phase II Proposed Approach
- Phase II Implementation

Program Overview - CSO Sampling System and Flowchart



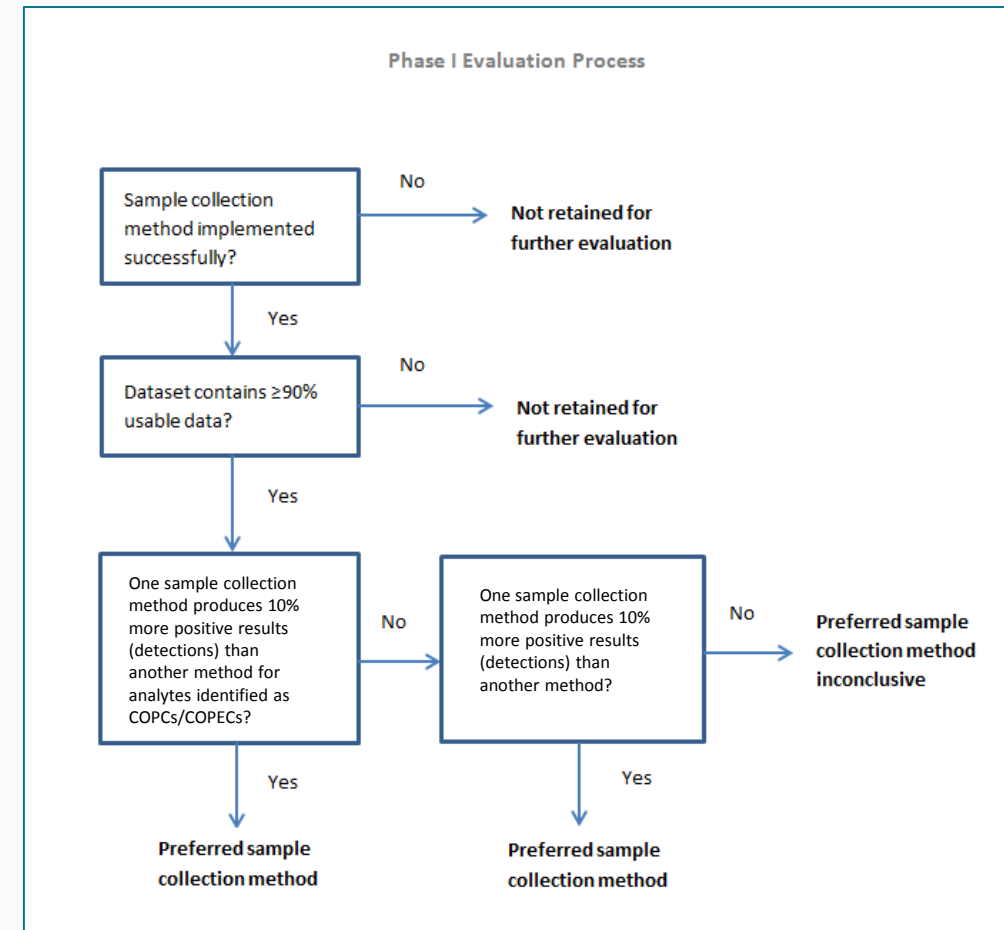
Phase I Chronology

Event and Attempt	Date	HSM	LSM	Whole Water	Notes
Event 1, Attempt 1	June 10, 2013	PCDDs/PCDFs, PCB congeners	PCDDs/PCDFs, PCB congeners	PCDDs/PCDFs, PCB congeners	Insufficient solids; did not combine fines and non-fines
Event 1, Attempt 2	July 1, 2013	All, excluding PCDDs/PCDFs, PCB congeners	All, excluding PCDDs/PCDFs, PCB congeners	All, excluding PCDDs/PCDFs, PCB congeners	-
Event 2, Attempt 1	October 7, 2013	VOCs	VOCs	VOCs	Abbreviated overflow
Event 2, Attempt 2	December 7, 2013	All, excluding VOCs	All, excluding VOCs	All, excluding VOCs	-
Event 1, Attempt 3	April 30, 2014	PCDDs/PCDFs, PCB congeners, chlorinated herbicides	PCDDs/PCDFs, PCB congeners, chlorinated herbicides	PCDDs/PCDFs, PCB congeners, chlorinated herbicides	Resampled primarily to address fines and non-fines; data usability

Phase I Data Evaluation Process – 4 Steps

Phase I data evaluated on an analytical group basis for each sampling approach:

1. Implementability of field sampling and processing
2. Data quality and usability
3. Frequency of COPC/COPEC detections
4. Frequency of detections of all analytes



Phase I Findings and Recommendations

Sample Collection Technique	PCDD/PCDF	PCB Congeners	Aroclor PCBs	Organochlorine Pesticides	SVOC	SVOC SIM	Chlorinated Herbicides	Cyanide	VOC	TEPH
LSM					○	○	○	○	○	○
HSM	✓	✓	✓	✓						
WW										


Notes:

- ✓ = selected sampling method
- = recommended sample collection method inconclusive

- Recommendations based on number of detections (sensitivity)
- Recommend hybrid sampling program for Phase II
 - Use most sensitive sampling method for each analytical group
 - Iterative approach (additional phase starting with Phase II-A) to collect data and make adjustments to meet project objectives

Phase I Data Evaluation Summary

	Method(s) with Greatest Number of Detections		
	<i>Total</i>	<i>Particulate</i>	<i>Dissolved</i>
PCDD/Fs (17 congeners)	HSM (13/17) LSM (3/17) WW (4/17)	HSM (13/17) LSM (3/17)	HSM (4/17) LSM (2/17)
PCBs (168 congeners)	HSM (99/168) LSM (34/168) WW (62/168)	HSM (99/168) LSM (33/168)	HSM (19/168) LSM (9/168)
Pesticides (28 analytes)	HSM (13/28) LSM (11/28) WW (12/28)	HSM (10/28) LSM (8/28)	HSM (10/28) LSM (9/28)

Legend: data from average of multiple events
 (x/y) where x = number of detections and y = total possible detections
 differences statistically significant
 (99/168) preferred sampling method

Phase I – Lessons Learned

- Field Implementability
 - Unpredictable overflow trigger and duration
 - Multiple attempts may be needed to generate target sample mass due to time limitation
 - Two different solids types in centrifuge bowl
 - Lower TSS than anticipated
 - LSM bottle shipment proved challenging (breakage)
- Laboratory Implementability
 - LSM sample preparation and filtration (10L) not readily implementable at full scale
 - Did not evaluate performance of cartridge filters
 - LSM particulate mass collected not sufficient to meet PQLs
- Data evaluation
 - Unanticipated variability in results obtained between sampling events

Supporting Information for Method Selection

- HSM more sensitive than LSM (per Phase I data evaluation process)
- HSM met program PQLs
- HSM program uses standard analytical methods
- HSM main field implementation challenge (sample collection timing) manageable
- HSM solid mass can be increased through longer field processing time
- LSM method did not meet program PQLs for solids
- LSM laboratory sample method processing (10L) is not feasible full scale
- LSM sample bottle shipment proved challenging due to breakage
- LSM solid mass limited to TSS content of sample volume

(HSM dissolved sample not filtered down to 0.45 microns)

Phase II Proposed Approach - Iterative Program

- Phase IIA
 - Target three samples
 - SWO – wet weather flow
 - CSO and PVSC interceptor – dry weather non-overflow conditions
 - Evaluate results
- Full scale implementation

Phase II – Benefits of Proposed Approach

- Shorter program duration and more controlled conditions
- Meet program PQLs for both solid and liquid phase
- SWMM & rainfall-runoff models can use SWO and dry weather sewer data to model CSO overflows
- Assess performance of program implementation before full-scale
 - non-overflow conditions
 - SWO

Phase IIA Implementation Overview

- Identify/perform reconnaissance of proposed sampling locations
- Update laboratory/sampling procedures
- Prepare QAPP Addendum
- Obtain necessary permits and approvals
- Collect samples

Information for Modelers

- Sewer/CSO network details
- Most recent SWMM
- Flow and chemistry data within the sewer/CSO network outside the plant
- System operations data pertaining to gates, interceptors, overflow triggers
- Operations reports & studies published to support permitting, SWMM and other initiatives

Questions

